Pushing the Envelope			
2005 Science			
Curriculum Framework			
Arkansas Science			
Grade 5			
Activity/Lesson	**State**	**Standards**	
History of Aviation Propulsion (pgs. 5-9)	AR	SCI.5.PS.5.5.10	Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology: Investigate scientists, careers, and historical breakthroughs related to physical properties, physical changes, and states of matter
History of Aviation Propulsion (pgs. 5-9)	AR	SCI.5.PS.6.5.7	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Investigate careers, scientists, and historical breakthroughs related to simple machines and potential and kinetic energy
Chemistry (pgs. 25-41)	AR	SCI.5.PS.5.5.2	Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology: Conduct scientific investigations on physical properties of objects
Chemistry (pgs. 25-41)	AR	SCI.5.PS.5.5.3.a	Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology: Identify common examples of physical properties (length)
Chemistry (pgs. 25-41)	AR	SCI.5.PS.5.5.8	Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology: Model the motion and position of molecules in solids, liquids, and gases in terms of kinetic energy
Chemistry (pgs. 25-41)	AR	SCI.5.PS.5.5.10	Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology: Investigate scientists, careers, and historical breakthroughs related to physical properties, physical changes, and states of matter
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2005 Science			
Curriculum Framework			
Arkansas Science			
Grade 6			
Activity/Lesson	**State**	**Standards**	

History of Aviation Propulsion (pgs. 5-9)	AR	SCI.6.PS.6.6.10	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Investigate careers, scientists, and historical breakthroughs related to compound machines and forces
Types of Engines (pgs. 11-23)	AR	SCI.6.PS.6.6.7.b	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Describe the effects of force (speed up, slow down or change the direction of motion)
Types of Engines (pgs. 11-23)	AR	SCI.6.PS.6.6.9	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Conduct investigations to calculate the change in speed caused by applying forces to an object
Chemistry (pgs. 25-41)	AR	SCI.6.PS.5.6.2	Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology: Compare and contrast characteristics of physical and chemical properties
Physics and Math (pgs. 43-63)	AR	SCI.6.PS.5.6.4	Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology: Apply skills of scientific investigation to determine density using SI units
Physics and Math (pgs. 43-63)	AR	SCI.6.PS.6.6.3	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Conduct investigations of various forces using SI units (newton)
Physics and Math (pgs. 43-63)	AR	SCI.6.PS.6.6.4.b	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Recognize and give examples of different types of forces (magnetic forces)
Physics and Math (pgs. 43-63)	AR	SCI.6.PS.6.6.7.a	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Describe the effects of force (move a stationary object)
Physics and Math (pgs. 43-63)	AR	SCI.6.PS.6.6.7.b	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Describe the effects of force (speed up, slow down or change the direction of motion)

Physics and Math (pgs. 43-63)	AR	SCI.6.PS.6.6.7.c	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Describe the effects of force (change the shape of objects)
Physics and Math (pgs. 43-63)	AR	SCI.6.PS.6.6.8	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Conduct investigations to demonstrate change in direction caused by force
Physics and Math (pgs. 43-63)	AR	SCI.6.PS.6.6.9	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Conduct investigations to calculate the change in speed caused by applying forces to an object
Physics and Math (pgs. 43-63)	AR	SCI.6.PS.6.6.10	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Investigate careers, scientists, and historical breakthroughs related to compound machines and forces
Rocket Activity (pgs. 69-75)	AR	SCI.6.PS.6.6.3	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Conduct investigations of various forces using SI units (newton)
Rocket Activity (pgs. 69-75)	AR	SCI.6.PS.6.6.4.b	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Recognize and give examples of different types of forces (magnetic forces)
Rocket Activity (pgs. 69-75)	AR	SCI.6.PS.6.6.7.a	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Describe the effects of force (move a stationary object)
Rocket Activity (pgs. 69-75)	AR	SCI.6.PS.6.6.7.b	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Describe the effects of force (speed up, slow down or change the direction of motion)
Rocket Activity (pgs. 69-75)	AR	SCI.6.PS.6.6.8	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Conduct investigations to demonstrate change in direction caused by force

Rocket Activity (pgs. 69-75)	AR	SCI.6.PS.6.6.9	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Conduct investigations to calculate the change in speed caused by applying forces to an object
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2005 Science			
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Arkansas Science			
Grade 7			
Activity/Lesson	**State**	**Standards**	
History of Aviation Propulsion (pgs. 5-9)	AR	SCI.7.PS.6.7.6	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Investigate careers, scientists, and historical breakthroughs related to laws of motion
Chemistry (pgs. 25-41)	AR	SCI.7.PS.5.7.3	Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology: Identify compounds as substances consisting of two or more elements chemically combined
Physics and Math (pgs. 43-63)	AR	SCI.7.PS.6.7.1	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Compare and contrast Newton's three laws of motion
Physics and Math (pgs. 43-63)	AR	SCI.7.PS.6.7.2	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Conduct investigations demonstrating Newton's first law of motion
Physics and Math (pgs. 43-63)	AR	SCI.7.PS.6.7.3	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Demonstrate Newton's second law of motion
Physics and Math (pgs. 43-63)	AR	SCI.7.PS.6.7.4	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Conduct investigations of Newton's third law of motion
Physics and Math (pgs. 43-63)	AR	SCI.7.PS.6.7.5	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Explain how Newton's three laws of motion apply to real world situations (e.g., sports, transportation)

Rocket Activity (pgs. 69-75)	AR	SCI.7.PS.6.7.1	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Compare and contrast Newton's three laws of motion
Rocket Activity (pgs. 69-75)	AR	SCI.7.PS.6.7.4	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Conduct investigations of Newton's third law of motion
Rocket Activity (pgs. 69-75)	AR	SCI.7.PS.6.7.5	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology: Explain how Newton's three laws of motion apply to real world situations (e.g., sports, transportation)
Pushing the Envelope			
2005 Science			
Curriculum Framework			
Arkansas Science			
Grades 9-12 (Physical Science)			
Activity/Lesson	**State**	**Standards**	
Types of Engines (pgs. 11-23)	AR	SCI.9-12.P.6.PS.3	Students shall demonstrate an understanding of the role of forces in physics: Compare and contrast among speed, velocity and acceleration
Types of Engines (pgs. 11-23)	AR	SCI.9-12.P.6.PS.4.a	Students shall demonstrate an understanding of the role of forces in physics: Solve problems using the formulas for speed and acceleration (v = d/t)
Chemistry (pgs. 25-41)	AR	SCI.9-12.C.1.PS.1	Students shall demonstrate an understanding of matter's composition and structure: Compare and contrast chemical and physical properties of matter, including but not limited to flammability, reactivity, density, buoyancy, viscosity, melting point and boiling point
Chemistry (pgs. 25-41)	AR	SCI.9-12.C.2.PS.4	Students shall demonstrate an understanding of the role of energy in chemistry: Compare and contrast Boyle's law and Charles' law
Chemistry (pgs. 25-41)	AR	SCI.9-12.C.3.PS.1.e	Students shall compare and contrast chemical reactions: Identify and write balanced chemical equations (combustion reaction)
Physics and Math (pgs. 43-63)	AR	SCI.9-12.P.6.PS.6	Students shall demonstrate an understanding of the role of forces in physics: Compare and contrast Newton's three laws of motion
Physics and Math (pgs. 43-63)	AR	SCI.9-12.P.6.PS.7	Students shall demonstrate an understanding of the role of forces in physics: Design and conduct investigations demonstrating Newton's first law of motion

Physics and Math (pgs. 43-63)	AR	SCI.9-12.P.6.PS.8	Students shall demonstrate an understanding of the role of forces in physics: Conduct investigations demonstrating Newton's second law of motion
Physics and Math (pgs. 43-63)	AR	SCI.9-12.P.6.PS.9	Students shall demonstrate an understanding of the role of forces in physics: Design and conduct investigations demonstrating Newton's third law of motion
Physics and Math (pgs. 43-63)	AR	SCI.9-12.P.6.PS.10.a	Students shall demonstrate an understanding of the role of forces in physics: Calculate force, mass, and acceleration using Newton's second law of motion: F=ma, Where f=force, m=mass, a=acceleration
Physics and Math (pgs. 43-63)	AR	SCI.9-12.P.6.PS.10.b	Students shall demonstrate an understanding of the role of forces in physics: Calculate force, mass, and acceleration using Newton's second law of motion: F=ma, Where f=force, m=mass, a=acceleration
Rocket Activity (pgs. 69-75)	AR	SCI.9-12.P.6.PS.6	Students shall demonstrate an understanding of the role of forces in physics: Compare and contrast Newton's three laws of motion
Rocket Activity (pgs. 69-75)	AR	SCI.9-12.P.6.PS.9	Students shall demonstrate an understanding of the role of forces in physics: Design and conduct investigations demonstrating Newton's third law of motion
Rocket Activity (pgs. 69-75)	AR	SCI.9-12.P.6.PS.10.a	Students shall demonstrate an understanding of the role of forces in physics: Calculate force, mass, and acceleration using Newton's second law of motion: F=ma, Where f=force, m=mass, a=acceleration
Rocket Activity (pgs. 69-75)	AR	SCI.9-12.P.6.PS.10.b	Students shall demonstrate an understanding of the role of forces in physics: Calculate force, mass, and acceleration using Newton's second law of motion: F=ma, Where f=force, m=mass, a=acceleration
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2005 Science			
Curriculum Framework			
Arkansas Science			
Grades 9-12 (Physics)			
Activity/Lesson	**State**	**Standards**	
History of Aviation Propulsion (pgs. 5-9)	AR	SCI.9-12.MF.4.P.5.c	Students shall understand the relationship between work and energy: Prove the relationship of time, energy and power through problem solving (Where P = power; W = work; F = force; v = velocity; T = time)
Types of Engines (pgs. 11-23)	AR	SCI.9-12.MF.1.P.3.a	Students shall understand one-dimensional motion: Apply kinematic equations to calculate distance, time, or velocity under conditions of constant acceleration (a = v/t)

Types of Engines (pgs. 11-23)	AR	SCI.9-12.MF.1.P.3.b	Students shall understand one-dimensional motion: Apply kinematic equations to calculate distance, time, or velocity under conditions of constant acceleration (a(ave) = delta v/delta t)
Types of Engines (pgs. 11-23)	AR	SCI.9-12.MF.1.P.3.c	Students shall understand one-dimensional motion: Apply kinematic equations to calculate distance, time, or velocity under conditions of constant acceleration (delta x = 1/2 (v(f) + v(f)) (delta t))
Types of Engines (pgs. 11-23)	AR	SCI.9-12.MF.4.P.5.b	Students shall understand the relationship between work and energy: Prove the relationship of time, energy and power through problem solving (P = Fv)
Chemistry (pgs. 25-41)	AR	SCI.9-12.MF.6.P.4.a.4	Students shall understand the concepts of fluid mechanics: Use the ideal gas law to predict the properties of an ideal gas under different conditions
Chemistry (pgs. 25-41)	AR	SCI.9-12.MF.6.P.4.b.4	Students shall understand the concepts of fluid mechanics: Use the ideal gas law to predict the properties of an ideal gas under different conditions
Physics and Math (pgs. 43-63)	AR	SCI.9-12.MF.1.P.9	Students shall understand one-dimensional motion: Apply Newton’s first law of motion to show balanced and unbalanced forces
Physics and Math (pgs. 43-63)	AR	SCI.9-12.MF.1.P.10.a	Students shall understand one-dimensional motion: Apply Newton’s second law of motion to solve motion problems that involve constant forces (F = ma)
Physics and Math (pgs. 43-63)	AR	SCI.9-12.MF.1.P.11	Students shall understand one-dimensional motion: Apply Newton’s third law of motion to explain action-reaction pairs
Physics and Math (pgs. 43-63)	AR	SCI.9-12.MF.2.P.3.a	Students shall understand two-dimensional motion: Calculate the magnitude and direction of a vector from its components ($d^2 = x^2 + y^2$)
Physics and Math (pgs. 43-63)	AR	SCI.9-12.MF.2.P.3.b	Students shall understand two-dimensional motion: Calculate the magnitude and direction of a vector from its components (tan to the -1 power (theta) = x/y)
Rocket Activity (pgs. 69-75)	AR	SCI.9-12.MF.1.P.9	Students shall understand one-dimensional motion: Apply Newton’s first law of motion to show balanced and unbalanced forces
Rocket Activity (pgs. 69-75)	AR	SCI.9-12.MF.1.P.11	Students shall understand one-dimensional motion: Apply Newton’s third law of motion to explain action-reaction pairs
Rocket Activity (pgs. 69-75)	AR	SCI.9-12.MF.4.P.1.a	Students shall understand the relationship between work and energy: Calculate net work done by a constant net force (W(net) = F(net) d cos theta)